
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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SECTION 09515

ACOUSTIC CEILINGS, CONCEALED GRID
06/04

NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers acoustic tile concealed-grid ceilings and fire-rated acoustic ceilings.

This section does not include ventilating ceiling systems.

Drawings must include a complete design indicating the character of the work to be performed and giving the following as required:

Location of each type of acoustic ceiling, type of floor or roof construction, and mounting dimensions

Location of recessed lighting fixtures, air duct outlets, and access tile or panels

Location of sound-transmission-rated acoustic ceilings

Location of fire-rated acoustic ceilings, and the fire resistance classification of the floor or roof construction assembly incorporating the acoustical ceiling

Hanger slots or clips to receive hanger wires for suspension systems supported by metal floor decking and concrete construction are specified in Section 05311, "Steel Floor Deck."

Hanger slots to receive hanger wires for suspension systems supported by permanent metal form and concrete construction are specified in Section 03131, "Permanent Steel Forms."

Suspension systems for gypsum wallboard ceilings (except for acoustic tile - gypsum backing board ceilings) and sound-transmission-rated gypsum wallboard partitions are specified in Section 09260, "Gypsum Board Assemblies."

Suspension systems for plaster ceilings and sound-transmission-rated plaster partitions and ceilings are specified in Section 09200, "Lath and Plaster."

Sound transmission rated movable partitions shall conform to ASTM E 90.

Air ducts, air intake and exhaust ceiling fixtures, ductwork, supports, and other mechanical systems located above acoustic ceilings, are specified in Division 15, "Mechanical."

Recessed lighting fixtures and other electrical work in and above acoustic ceilings are specified in Division 16, "Electrical."

PART 1 GENERAL

1.1 REFERENCES

NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

The publications listed below form a part of this section to the extent referenced:

ASME INTERNATIONAL (ASME)

ASME B18.6.1 (1981; R 1997) Wood Screws (Inch Series)

ASTM INTERNATIONAL (ASTM)

ASTM A 366/A 366M (1997e1) Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality

ASTM A 489 (2003) Standard Specification for Carbon Steel Eyebolts

ASTM A 591/A 591M (1998) Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating (Weight) Mass Applications

ASTM B 221/B 221M (2003) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B 633 (1998) Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

ASTM C 423 (2002a) Standard Test Method for Sound

Absorption and Sound Absorption
Coefficients by the Reverberation Room
Method

ASTM C 635	(2000) Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
ASTM C 636	(2003) Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
ASTM E 119	(2000a) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E 1264	(1998) Standard Classification for Acoustical Ceiling Products
ASTM E 413	(1987; R 1999) Standard Classification for Rating Sound Insulation
ASTM E 90	(2002) Standard Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions
ASTM F 835	(2003) Alloy Steel Socket Button and Flat Countersunk Head Cap Screws
ASTM F 835M	(2003) Alloy Steel Socket Button and Flat Countersunk Head Cap Screws (Metric)

INDUSTRIAL FASTENERS INSTITUTE (IFI)

IFI 502	(1982) Metric Tapping Screws
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U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS FF-B-588	(Rev D) Bolt, Toggle; and Expansion Sleeve, Screw
FS FF-S-325	(Int Amd 3) Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir	(2003) Building Materials Directory
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1.2 SUBMITTALS

**NOTE: Review submittal description (SD) definitions
in Section 01330, "Submittal Procedures," and edit
the following list to reflect only the submittals
required for the project. Submittals should be kept
to the minimum required for adequate quality
control. Include a columnar list of appropriate**

**products and tests beneath each submittal
description.**

The following shall be submitted in accordance with Section 01330,
"Submittal Procedures," in sufficient detail to show full compliance with
the specification:

SD-02 Shop Drawings

The following drawings shall be submitted in accordance with
paragraph entitled, "Acoustical Ceiling Information," of this
section.

Fabrication Drawings
Installation Drawings

SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following
items showing UL classification of fire-rated ceilings giving
materials, construction details, types of floor and roof
constructions to be protected, and UL design number and fire
protection time rating for each required floor or roof
construction and acoustic ceiling assembly.

Fire-Rated Ceiling Systems
Acoustic Materials
Suspension System Materials
Suspension Materials

SD-04 Samples

Samples of the following shall be submitted in accordance with
paragraph entitled, "Acoustical Ceiling Information," of this
section.

Acoustic Units: Three full-size samples of each type and pattern
to illustrate the manufacturer's standard color chart and
appearance range.

Suspension System Members: Three full size samples of each type.

Anchorage Devices and Fasteners: Three full-size samples of each
type.

After approval, samples may be used in the construction provided
each sample is clearly identified and its location recorded.

SD-07 Certificates

Certificates shall be submitted for following showing conformance
with the referenced standards contained in this section.

Acoustic Materials
Suspension System Materials
Suspension Materials

SD-08 Manufacturer's Instructions

Manufacturer's instructions shall be submitted showing printed instructions covering installation of Acoustic Materials and Suspension System Materials.

The Manufacturer's Instructions for preventive maintenance and inspection shall be submitted showing the acoustic material manufacturer's recommended cleaning and application methods.

1.3 DELIVERY, HANDLING, AND STORAGE

Materials shall be delivered and stored in their original, unopened, packages bearing labels clearly identifying manufacturer's name, brand name, material, type or class, UL listing when applicable, and other pertinent data.

Acoustic materials shall be stored in a weathertight and dry place, having a temperature not less than 65 degrees F 18 degrees C and relative humidity not more than 70 percent, and for at least 24 hours prior to installation.

1.4 FIELD MEASUREMENTS

Field measurements shall be taken prior to preparation of drawings and fabrication to ensure proper fitting of the work.

1.5 PERFORMANCE REQUIREMENTS

1.5.1 Noise Reduction Coefficient Grade

Noise reduction coefficient (NRC) grade of acoustic ceilings shall be tested or certified by an approved testing laboratory in accordance with ASTM C 423, and shall be as follows:

NOTE: Prior to selection, the acoustic unit type, thickness, and mounting type must be coordinated. Delete headings and the following listing and specify ceiling types, mounting types, and nrc grades when several are required.

<u>MOUNTING TYPE</u>	<u>NRC GRADE</u>
No. 7	0.70 to 0.80
No. 7	0.65 to 0.75
No. 7	0.60 to 0.70
No. 7	0.55 to 0.65
No. 7	0.50 to 0.60
No. 7	0.45 to 0.55

1.5.2 Ceiling Sound-Transmission Classification (STC)

NOTE: While noise reduction coefficient is

concerned with the noise level in a given room or single area, sound-transmission classification becomes a factor, when unwanted sound from one area invades the acoustic privacy of another area. Ceiling sound-transmission classification represents the reduction or loss of sound between the room containing the noise source, and the sound level in the receiving room, when the primary sound path is through the ceiling. A refinement of this method records the difference when a continuous or an interrupted suspended ceiling is used.

Select one of the following two paragraphs as required.

Sound-Transmission Classification (STC) of the indicated acoustic ceilings shall be an 11-frequency test method conforming to ASTM E 90, and shall be as follows:

Sound-Transmission Classification (STC) of the indicated acoustic ceilings shall be tested by an approved testing laboratory in accordance with the 16-frequency test method conforming to ASTM E 413, and shall be as follows:

NOTE: Delete inapplicable entries from the following listing. Prior to selection, the acoustic unit type, suspension type, and condition at partition must be coordinated.

<u>CONDITION AT PARTITIONS</u>	<u>CEILING STC</u>
Continuous	25 to 29
Continuous	30 to 34
Continuous	35 to 39
Continuous	40 to 44
Continuous	45 to 49
Interrupted	25 to 29
Interrupted	30 to 34
Interrupted	35 to 39
Interrupted	40 to 44
Interrupted	45 to 49

1.6 MAINTENANCE INSTRUCTIONS

The Contractor shall follow the acoustic material Manufacturer's Instructions for recommended cleaning and application methods, including precautions in the use of cleaning materials that may be detrimental to acoustic surfaces and the finish of exposed metal components.

1.7 ACOUSTICAL CEILING INFORMATION

Fabrication Drawings shall be submitted for concealed grid acoustic ceilings consisting of fabrication and assembly details to be performed in the factory.

Installation Drawings shall be submitted for concealed grid acoustic ceilings showing intermediate framing of hanger supports that fall between framing members; fastening of suspension system to top plate of nonbearing partitions; hanger fastenings at roof framing members and at main runners; acoustic unit support at ceiling fixtures; the splicing method for main and cross runners; positioning of splines; details of access acoustic tiles or panels; and the suspension system structural classification in accordance with ASTM C 635.

Samples of the following shall be submitted accordingly:

Acoustic Units: Three full-size samples of each type and pattern to illustrate the manufacturer's standard color chart and appearance range.

Suspension System Members: Three full size samples of each type.

Anchorage Devices and Fasteners: Three full-size samples of each type.

PART 2 PRODUCTS

2.1 FIRE-RATED CEILING SYSTEMS

All materials and methods used for fire-rated ceiling systems shall meet the minimum requirements of ASTM E 1264, ASTM C 635, ASTM C 636, and ASTM E 119.

2.2 ACOUSTIC MATERIALS

2.2.1 Cellulose Fiber Units

NOTE: These units are not recommended for use where they will be subjected to impact or abrasion, for use in areas of continuous high humidity (over 70 percent relative humidity), such as kitchens and swimming pools, or for use in fire-rated acoustic ceilings. Generally these units cost less than mineral fiber acoustic units.

Units shall be prefabricated, cellulose-composition type, not more than 25 flame spread index class and not less than 0.75 light reflectance coefficient grade, conforming to ASTM E 1264, Type I, Class A, LR minimum coefficient of 0.75.

NOTE: Specify finish when a white paint finish is not required.

Finish of exposed-to-view surfaces of the units shall be a factory-applied, washable, white paint.

2.2.2 Mineral Fiber Acoustic Units

NOTE: These acoustic units are not recommended for
use where they will be subjected to impact or
abrasion or for use in areas of continuous high
humidity (over 70 percent relative humidity).

Units shall be prefabricated, mineral composition type, not more than 25 flame spread index class and not less than 0.75 light reflectance coefficient grade, conforming to ASTM E 1264, Type III, Class A, LR minimum coefficient of 0.75.

NOTE: Specify finish when a white paint finish is
not required.

Finish of exposed-to-view surfaces of the units shall be a factory-applied, washable, white paint.

Finish of exposed-to-view surfaces of the units shall be a factory-applied, scuff-resistant and washable white finish, consisting of two paint coats and one vinyl coat.

2.2.3 Plastic Membrane-Faced Units

NOTE: These units are recommended for use where
frequent cleaning will be required. These units are
not recommended for use in areas of continuous high
humidity (over 70 percent relative humidity).

Units shall be mineral-composition type, not more than 25 flame spread index class, or not less than 0.75 light reflectance coefficient grade, conforming to ASTM E 1264, Type X, Class A, LR minimum coefficient of 0.75.

Plastic membrane shall be either a factory-applied, white, polyester-film material, not less than 0.0015 inch 0.38 millimeter thick, general purpose polyester film, or shall be a white, embossed-vinyl chloride film material for use in temperature range of minus 18 to plus 55 degrees C. Thickness tolerance shall be plus 0.0007 or minus 0.0003 inch. 0.018 or minus 0.008 millimeter.

2.2.4 Acoustic Tile

Tile shall be [cellulose-fiber] [mineral-fiber] [plastic membrane-faced] units, nominal 12 by 12 inches 300 by 300 millimeter by not less than [1/2-inch] [5/8-inch] [15] [18] millimeter thick, with [beveled] [square] edges, and kerfed and rabbeted or tongue and grooved joints.

2.2.5 Acoustic Panels

Panels shall be [cellulose-fiber] [mineral-fiber] [plastic membrane-faced] units, nominal 24 by 48 inches or 24 by 24 inches 600 by 1200 millimeter or 600 by 600 millimeter by not less than [1/2-inch] [5/8-inch] [15] [18] millimeter thick, with square trimmed and butt end edges and with beveled,

kerfed and rabbeted long edges.

Pattern shall be in accordance with ASTM E 1264, as follows:

NOTE: Delete inapplicable patterns.

[Pattern A (Regularly large-hole perforated)]
[Pattern B (Randomly large-hole perforated)]
[Pattern C (Finely perforated)]
[Pattern D (Fissured)]
[Pattern E (Striated)]
[Pattern F (Textured)]
[Pattern G (Smooth)]
[Pattern H (Other, as approved)]

2.3 SUSPENSION SYSTEM MATERIALS

2.3.1 Zinc-Coated, Cold-Rolled, Steel Sheets

Steel sheets shall be carbon steel conforming to ASTM A 366/A 366M, with not less than 0.00015 inch, 0.004 millimeter, electrodeposited, zinc coating conforming to ASTM B 633, or electrolytic, zinc-coated steel sheets of commercial quality carbon steel with Class C zinc coating conforming to ASTM A 591/A 591M.

2.3.2 Aluminum Extrusions

Extrusions shall be aluminum Alloy 6063, Temper T5, conforming to ASTM B 221/B 221M.

2.3.3 Carrying Channels

Channels shall be 1-1/2 inch 40 millimeter by not less than 19/32 inch, 15 millimeter, cold-formed U-shape sections, fabricated from zinc-coated, cold-rolled steel sheets not less than 0.0598 inch 1.52 millimeter thick.

Channels for fire-rated acoustic ceilings shall be as specified in the UL fire classification design number, or numbers, approved for the work.

2.3.4 Concealed, Indirect-Hung, Main Runners

Main runners shall be cold-formed, Z-shape, H-shape, or J-shape sections fabricated from specified steel sheets not less than 0.0209 inch 0.531 millimeter thick. Bottom flange shall be suitable for the acoustic tile joint used.

Structural classification shall be [light] [intermediate] [heavy] duty in accordance with ASTM C 635.

Fire-rated main runners, for fire-rated acoustic ceilings, shall be

approved for use in the UL fire classification design number as listed in the UL Bld Mat Dir "Building Materials Directory", 40 U18.18. Cartons shall bear UL listing.

2.3.5 Concealed Cross Runners and Accessories

Cross runners shall be designed for use with the type and structural classification of the main runners used in accordance with ASTM C 635. Cross runners shall be fabricated from specified steel sheets not less than 0.0179 inch 0.455 millimeter thick. Bottom flange shall be suitable for the acoustic tile joint used.

Antibreather splines, hold-down clips, main runner connectors, and other accessories required to complete the ceiling installation shall be provided. Such accessories shall be designed for use with the type of main runner used.

Fire-rated cross runners and accessories for fire-rated acoustic ceilings shall be designed for use with the fire-rated main runners used.

2.3.6 Wall Moldings

NOTE: Fire-rated aluminum wall moldings are not available.

Moldings shall be cold-formed angle or U-shape sections, fabricated from specified steel sheets not less than 0.0209 inch 0.531 millimeter thick.

Moldings shall be angle-shape sections fabricated from specified aluminum sheet not less than 0.050 inch 1.3 millimeter thick. Aluminum surfaces that will come in contact with dissimilar metals, masonry, concrete, or wood, shall be shop painted to prevent corrosion. Paint shall be applied to dry, clean surfaces, by an approved method, to provide a continuous minimum dry-film thickness of 1.5 mils. 0.038 millimeter.

Height of moldings shall be as required to accommodate the type of runners used. Where runners are concealed, the exposed leg width of wall moldings shall be not less than 15/16 inch. 23.8 millimeter. Where bullnose masonry units are used for wall and partition construction, inside- and outside-corner caps shall be provided. Corner caps shall be one-piece, shop-fabricated units having a radius conforming to the bullnose, and with an exposed face width the same as the exposed width of the adjoining wall molding. Corner caps shall extend at least 12 inches 300 millimeter on each side of the corner, and shall be butt-joined to the adjacent wall molding with concealed fastenings.

NOTE: Specify finish when white enamel finish is not required.

Finish of exposed-to-view surfaces of wall moldings and corner caps shall be baked-on white enamel. Finish shall pass the high-humidity test in accordance with ASTM C 635.

Moldings for fire-rated ceilings shall be approved for use in the UL fire classification design number, or numbers, approved for the work.

2.4 SUSPENSION MATERIALS

2.4.1 Hanger Inserts

Inserts shall consist of a wire loop and steel shell embedded in concrete and designed to provide a single wire loop exposed flush with the concrete surface. Wire shall be galvanized, carbon steel, not less than 0.177 inch 5 millimeter in diameter. Shell shall be formed from galvanized carbon steel sheets not less than 0.0179 inch 0.455 millimeter thick.

Inserts shall not be removable when embedded in concrete of 3,000-pound per square inch 20 Megapascal compressive strength and subjected to a 300-pound 1300 newton tension load test in an axial direction, nor shall the concrete show evidence of failure attributable to the hanger insert.

2.4.2 Eyebolts

Eybolls shall be weldless, forged carbon steel, straight shank type, conforming to ASTM A 489, Type I. Eyebolt size shall be not less than 1/4 inch 8 millimeter, zinc coated, or cadmium plated.

2.4.3 Masonry Anchorage Devices

Anchorage devices for eyebolls shall conform to FS FF-S-325, Group I, Type 1, Class 2.

Anchorage devices for machine screws shall conform to FS FF-S-325, Group I, Type 1, Class 1.

Anchorage devices for wood screws shall conform to FS FF-S-325, Group IV, Type 1.

2.4.4 Hanger Wire

Hanger wire shall be 12-gage 2.1 millimeter galvanized, soft annealed, mild steel wire in accordance with ASTM C 636.

2.4.5 Machine Screws

Machine screws shall conform to ASTM F 835. ASTM F 835M.

2.4.6 Wood Screws

Wood screws shall conform to ASME B18.6.1, IFI 502, of zinc-coated carbon steel.

2.4.7 Toggle Bolts

Toggle bolts shall conform to FS FF-B-588, Class A, Type II, Style 1.

PART 3 EXECUTION

3.1 CONDITIONS AT BUILDING

Work above the ceiling line shall have been completed and approved prior to the start of acoustic work.

Spaces to receive acoustic materials shall be maintained at 60 to 85

degrees F 15 to 30 degrees C and not more than 70 percent relative humidity for at least 48 hours prior to and during the installation of acoustic work, and until final acceptance.

3.2 ARRANGEMENT OF ACOUSTIC CEILINGS

Acoustic units shall be so arranged that units less than one-half width do not occur unless otherwise indicated or required to suit conditions.

Ceilings shall be so arranged that either the tile joint or the tile centerline centers on ceiling fixtures.

Tiles shall be so arranged that joints are parallel with room axis in both directions, and straight and in alignment.

3.3 PLACING SUSPENSION SYSTEM MEMBERS

NOTE: Slots or clips to receive hanger wires for suspension systems supported by metal decking are specified in the respective metal decking sections. Those supported by permanent metal forms are in Section 03131, "Permanent Steel Forms." Slots or clips, when used, are to be located not more than 24 inches 600 millimeter on center in both directions, not more than 9 inches 225 millimeter from end walls, and not more than 12 inches 300 millimeter from side walls.

Hanger wires shall be vertical and suspended from structural supporting members as follows:

[Wires shall be secured by wire-tying to inserts embedded in concrete.]

[Wires shall be secured by anchorage devices and wire-tying to precast concrete.]

[Wires shall be secured to the bottom chord of joists or structural members by wire-tying or by metal clips especially designed for the purpose.]

Direct-hung suspension system members shall be supported by hangers spaced not more than 6 inches 150 millimeter from each end and not more than 48 inches 1200 millimeter on center between end hangers. Members shall be kept 1/2 inch 15 millimeter away from walls or partitions. Hangers shall be attached to the members to prevent vertical movement or rotation of the member. Members shall be installed level within 1/8 inch in 12 feet. 3 in 3700 millimeter. Leveling shall be performed with the hanger wires taut to prevent subsequent downward movement of the members when the ceiling loads are imposed. Kinks or bends shall not be made in the hanger wires as a means of leveling the members.

Indirect-hung suspension system members shall be attached at right angles to the carrying channels by means of spring clips that maintain tight contact between the indirect-hung member and the carrying channel when the ceiling loads are imposed. Members shall be installed so they are level within 1/8 inch in 12 feet. 3 in 3700 millimeter. Leveling shall be performed with the indirect-hung members in firm contact with the carrying

channels to prevent subsequent downward movement when the ceiling loads are imposed.

Cross runners shall be installed at the required center distances within 1/32 inch; 0.8 millimeter; this tolerance shall be noncumulative beyond 12 feet. 3700 millimeter. Intersecting cross runners shall form a 90 degree angle.

Splines used to form a concealed joint between adjacent tiles shall be compatible with the tile edge design so that the adjacent tile will be horizontal when installed. Where splines are longer than the dimension between the edges of supporting members running perpendicular to the splines, the splines shall be placed to rest either all above or all below the main runners.

NOTE: Delete the following paragraph when wall moldings are not required.

Wall moldings shall be installed so that the extended leg of angle moldings, or the bottom flange of channel moldings, lies in the same horizontal plane as that of the runners resting on the molding. Wall molding at inside corners shall be cut and bent to conform to the corner and at outside corners shall be neatly butted. Corner caps shall be provided where the corners are constructed of bullnosed masonry units. Moldings shall be fastened to walls at not more than 3 inches 80 millimeter from each end, and not more than 16 inches 400 millimeter on center between the end fastener holes. Fastening to wood plugs in masonry or concrete is not permitted.

3.4 SETTING MASONRY ANCHORAGE DEVICES

Drilled holes shall be left rough, not reamed, and free from drill dust.

3.5 FRAMING OPENINGS FOR CEILING FIXTURES

Support members shall be provided at openings for ceiling fixtures and as indicated. Support members shall be of the size required to support the load without permitting deflection of the ceiling in excess of the performance requirements for the suspension system structural classification specified. Intermediate supports and hanger wires shall be provided if required.

3.6 ACOUSTIC TILE, CONCEALED-GRID CEILINGS

Carrying channels shall be spaced not more than 48 inches 1200 millimeter on center.

Where recessed lighting fixtures are indicated, carrying channels shall be provided along the sides of each fixture.

[Concealed, indirect-hung main runners shall be spaced not more than 12 inches 300 millimeter on center. Concealed cross runners shall be spaced at the center distances required by the size of tile used.]

[Concealed, indirect-hung main runners shall be spaced not more than 24 inches 600 millimeter on center. Concealed cross runners shall be spaced nominally 12 inches 300 millimeter on center.]

When 12 by 12 inch 300 by 300 millimeter tiles are used, 12-inch 300 millimeter long, intermediate, concealed cross runners shall be provided, installed parallel to the main runners, and intersecting the 24-inch 600 millimeter long concealed cross runners at midpoint.

Moldings shall be installed at walls and other vertical surfaces, except where movable metal partitions having caps designed to receive suspension system members are indicated.

Tiles shall be installed with the bottom flange of the concealed cross runners inserted into the tile edges. Concealed splines shall be inserted into the tile edges at right angles to the cross runners to prevent breathing and to level adjoining acoustic tile. Spring clips shall be provided at the walls parallel to the main runners to hold the tiles snug against the main runners. Acoustic tiles shall be installed in a uniform manner with joints straight, in alignment, and fitted to hairline joints between adjoining tiles.

NOTE: Access units must be provided directly under each valve, flow indicator, damper, or air splitter that is located above the ceilings and would otherwise be inaccessible. Location of ceiling access units must be indicated on the drawings.

Ceiling access units shall be provided where indicated. Access units shall be 12 by 24 inches. 300 by 600 millimeter. Access units shall be fabricated of acoustic tiles, of the size used in the work, and with edges modified so the access unit may be easily lifted out of the suspension system. Concealed suspension system members, designed for ceiling access units, shall be provided, as required, for each access opening.

3.7 FIRE-RATED ACOUSTIC CEILINGS

NOTE: Delete the paragraph heading and the following paragraph when not applicable. If retained, insert UL design No.

Fire-rated acoustic ceiling assembly shall be identified by UL Design No. [_____] in UL Bld Mat Dir.

NOTE: Delete the following paragraph when recessed lighting fixtures in fire-rated acoustic ceilings are not required. If retained, insert UL design No.

Light-fixture protection shall be provided for all recessed lighting fixtures in fire-rated acoustic ceilings. Light-fixture protection shall be fabricated of the materials specified in the approved UL fire-resistance classification design number, cut to proper size, and installed over each light fixture opening in accordance with the UL fire-resistance classification design number approved for the work.

NOTE: Insert UL design No.

Ceiling openings for lighting and air distribution shall be in accordance with UL Design No. [_____].

3.8 MARKING LOCATION OF MECHANICAL SYSTEM CONTROLS

Access units in acoustic ceilings, located directly below mechanical system controls shall be marked with a circular identification plate. Plate shall be 0.032-inch 0.81 millimeter thick aluminum, 3/4-inch 20 millimeter in diameter, stamped with the letters "AP", finished the same as the acoustic material, and attached by an approved method near one corner on the face of each access unit.

3.9 ACCEPTANCE PROVISIONS

3.9.1 Repairing

Damaged and unacceptable portions of completed work shall be removed and replaced with new work to match adjacent surfaces at no additional cost to the Government.

3.9.2 Cleaning

Surfaces of the work, and adjacent surfaces soiled as a result of the work, shall be cleaned. Equipment, surplus materials, and rubbish from the work shall be removed from the site.

-- End of Section --